We evaluated the Coulter Dacos discrete analyzer (Coulter Electronics Inc., Hialeah, FL) for the following assays: albumin, alkaline phosphatase, aspartate transaminase, bilirubin, calcium, cholesterol, creatine kinase, creatinine, glucose, protein, urate, and urea. Overall precision was measured with three concentrations of control material for 20 days; CVs were generally satisfactory (2.3–3.7%) except for calcium. For eight of the 12 analytes CVs were less than 4%. Remaining CVs were: alkaline phosphatase 5.7–7.1%, aspartate transaminase 2.6–4.8%, bilirubin 4.2–8.3%, and cholesterol 1.7–4.5%.

There was good agreement with results for 17 samples from external quality-assurance schemes. Differences from the consensus mean were less than 4% for eight of 12 analyses and did not exceed 8.2%. Comparability with other laboratory methods was generally acceptable. For calcium and urate the observed differences were attributed to the calibrating materials.

Slight hemolysis caused negligible interference but severe hemolysis increased values for apparent creatine kinase and aspartate transaminase and lowered apparent concentrations of urate, cholesterol, alkaline phosphatase, and total protein. Arterial lipemia caused an increase in apparent urate and bilirubin and a decrease in total protein and cholesterol concentrations. Reagent carryover was negligible. Sample carryover was assessed with high (H) and low (L) concentration plasmas in the sequence HHHLLL. Carryover was undetectable when identical sample volumes were aspirated but, when the volume for the H samples only was increased to the maximum possible, carryover increased to about 1% for creatine kinase and aspartate transaminase.

The manufacturer’s claims for linearity and reagent stability were confirmed. Recalibration of calcium, cholesterol, and urate was necessary every 4 h. This limits the usefulness of the instrument for emergency work. The computer software, although comprehensive, was more cumbersome to use than desired.

This evaluation, for the Scientific and Technical branch of the Department of Health and Social Security (UK), was concluded in July 1984.

Enzyme immunochromatographic Assay of Phenytoin in Capillary and Venous Blood Compared with Fluorescence Polarization Immunoassay of Plasma from Epileptic Patients. Dan Haidukewych, Mary Louise Splane, and Beverly Vasos (Epilepsy Center of Michigan, Detroit, MI 48201)

We evaluated AccuLevel (Syntex Medical Diagnostics) assay kit for phenytoin (DPH) by determining DPH in capillary and venous blood from 68 patients and comparing these results with plasma values obtained by TDx (Abbott Diagnostics). Within-run precision of the immunochromatographic AccuLevel procedure was measured by assaying, 20 times, venous blood specimens from three patients determined by fluorescence polarization immunoassay of plasma to contain DPH at 5.5, 12.1, and 21.8 mg/L. The mean AccuLevel result was 5.8, 12.9, and 23.4 mg/L, respectively, with accompanying CVs of 3.5, 5.6, and 3.7%. Analytical recovery of phenytoin (0–30 mg/L) added to samples showed a mean difference of 5.5% between the two methods. Between-run reproducibility, measured on 11 days during a 41-day period with one control having a DPH target value of 10 mg/L, was calculated as <3.9%. During the precision study period, samples of capillary blood (in duplicate, \( \bar{y}_c \)) and venous blood (in duplicate, \( \bar{y}_v \)) from 68 patients were assayed for DPH by AccuLevel and compared with results for DPH in plasma (singlicate, x) by TDx. Linear regression gave the equations \( \bar{y}_c = 0.02 + 1.022x \) \((r = 0.964, n = 68, S_\text{xy} = 1.64) \) and \( \bar{y}_v = 0.258 + 0.97x \) \((r = 0.987, n = 68, S_\text{xy} = 0.92) \), indicating excellent agreement with the TDx method. Concentrations of DPH ranged from 3.1 to 26.4 mg/L for these patients. Although this simple AccuLevel procedure (15 min, requiring no instrument) is intended for physician’s office use, it has the potential for home use under the direction of the physician. Furthermore, the use of Automatic Finger Prick Pen (PENLET; Lifescan Inc.) to obtain capillary blood (12 μL) was surprisingly and uniformly painless to all patients, thus potentially enabling patients to sample their own blood.

This study was supported by Syntex Medical Diagnostics, which provided a generous supply of all reagents and associated disposable items. The expert assistance of Lorine Tanimoto, Assistant Manager for Clinical Studies, is gratefully acknowledged.